

Atlantic Richfield Company

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March 9, 2017

Ms. Lynda Deschambault
US EPA Region 9
75 Hawthorne Street (SFD-7-2)
San Francisco, CA 94105

RE: Leviathan Monthly Report for February 2017

Dear Ms. Deschambault:

The following text describes activities conducted during the month of February 2017 at the Leviathan Mine Site (site) and activities anticipated to occur during the upcoming month. These activities are organized by work area [Aspen Seep, Channel Underdrain (CUD) and Delta Seep (DS)], and site-wide tasks. This progress report is being submitted in accordance with Paragraph 62 of the Administrative Settlement Agreement and Order on Consent for Removal Action (AOC) (effective January 21, 2009). We have removed Gary Riley's name from the salutation based on your March 3, 2017 email stating that you would be assuming the role as remedial project manager for the early response actions effective through October 2017. We will keep Gary on the cc list unless you instruct otherwise.

ACTIVITIES FOR FEBRUARY

Aspen Seep

- Operated the Aspen Seep Bioreactor (ASB) Treatment System in recirculation mode for the month of February. A limited access season (LAS) winter site visit to the ASB Treatment System was completed on February 1, 2017. During the LAS winter site visit, routine operation and maintenance and compliance sampling activities were performed. The influent and effluent compliance sampling results are presented in Table 1. Recent influent flow rate, pH, and ORP field data are summarized in Table 2.
- On February 1, 2017 Generator 2 was repaired and placed in second priority.

CUD and DS

- The High Density Sludge (HDS) Treatment Plant and CUD and DS conveyance and collection equipment remained winterized during the month of February.

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Site-wide

- Continued to update the Leviathan Mine Project Database with data from monitoring performed by Atlantic Richfield and various agencies.
- On February 3, 2017 Atlantic Richfield provided the US EPA with a Technical Memorandum summarizing the field observations of the Leviathan Creek Culvert and Pond Storage Capacity in accordance with the Contingency Plan from the February 1, 2017 site visit.
- On February 14, 2017, Atlantic Richfield and U.S. Forest Service representatives inspected an accumulation of water in the area of the culvert on Leviathan Mine Road approximately 2 miles west of the Highway 395 turnoff. Although water was present behind the upgradient side of the culvert, the U.S. Forest Service concluded that the integrity of the Leviathan Mine road is in no way compromised by this condition, the culvert was not plugged, and this portion of Leviathan Mine Road could easily support mobilization of supplies and equipment to the mine site if needed for spring water treatment efforts.
- On February 15, 2017 Atlantic Richfield provided the US EPA with an email with the projected schedule for the next site visit.
- On February 21, 2017, a conference call was conducted with the US EPA to provide a general progress update.
- On February 23, 2017, Atlantic Richfield submitted the 2017 Hazardous Materials Business Plan (HMBP) to Alpine County via the California Environmental Reporting System (CERS).
- On February 27, 2017, Atlantic Richfield submitted the 2016 Amendment to the Removal Action Work Plan (RAWP) that describes activities to be performed under the AOC by Atlantic Richfield at the site during 2017.
- Continued compiling information for the 2016 Annual Completion Report (due April 10, 2017).
- Development of the 2017 Annual Road Operating Plan (due April 1, 2017 to the United States Department of Agriculture, Forest Service).

ACTIVITIES FOR UPCOMING MONTH

Aspen Seep

- Continue operation of the ASB Treatment System in recirculation mode and conduct LAS sampling, monitoring, and maintenance as outlined in the Removal Action Work Plan (RAWP). The March LAS winter access visit is scheduled the second week of March.
- Data from 2016 ASB Treatment System operations will be compiled for inclusion in the 2016 Annual Completion Report.

CUD and DS

- Data from 2016 HDS Treatment Plant operations will be compiled for inclusion in the 2016 Annual Completion Report.

March 9, 2017

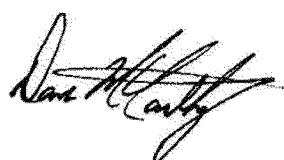
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Site-wide

- Continue to provide project progress updates to the US EPA via conference call. The next conference call is currently scheduled for March 21, 2017.
- Continue compiling information for the 2016 Annual Completion Report (due April 10, 2017).
- During late February and the first week of March, Atlantic Richfield was informed that the LRWQCB had conducted snow removal on Leviathan Mine Road and was beginning spring treatment operations to lower water levels in the upper ponds. Atlantic Richfield will continue to coordinate with the LRWQCB and its contractor as Atlantic Richfield prepares for its next winter access visit and 2017 spring Limited Access Season operations,

If you have any questions or comments, please feel free to contact me at (657) 529-4537 or via e-mail at Anthony.Brown@bp.com.

Sincerely,

 for

Tony Brown
Project Manager

Attachments:

- Table 1 – Aspen Seep Bioreactor Treatment System –Compliance Sample Results
Table 2 – Aspen Seep Bioreactor Treatment System – Recent Flow, pH, and ORP Field Measurements

cc: Gary Riley, U.S. EPA Region 9
Douglas Carey, Lahontan Regional Water Quality Control Board
Ronald Halsey, Atlantic Richfield Company
Andy Fiedler, Atlantic Richfield Company
Nathan Block, BP
Reginald Ilao, Atlantic Richfield Company
Adam Cohen, Esq., Davis Graham & Stubbs LLP
Dave McCarthy, Copper Environmental Consulting
Marc Lombardi, Amec Foster Wheeler Environment & Infrastructure, Inc.
Sandy Riese, EnSci, Inc.

TABLE 1
ASPEN SEEP BIOREACTOR TREATMENT SYSTEM - COMPLIANCE SAMPLE RESULTS
FEBRUARY 2017 MONTHLY SUMMARY
Draft - Provisional Data

Parameter	Basis	February 1, 2017 263ASPINF902 ASB Influent mg/L	February 1, 2017 263ASPEFF901 ASB Effluent mg/L	Maximum Discharge Criteria ² (mg/L)	Average Discharge Criteria ² (mg/L)
pH (s.u.) ¹	Field/Lab	2.77	7.44	-	6.0 - 9.0
Aluminum	Dissolved	29	0.071 J	4.0	2.0
Arsenic	Dissolved	0.00067 J	< 0.0010	0.34	0.15
Cadmium	Dissolved	0.0011	< 0.0010	0.009	0.004
Calcium	Dissolved	270 B	200 B	-	-
Chloride	Total	1.8	3.3	-	-
Chromium	Dissolved	0.0026	< 0.0020	0.97	0.31
Copper	Dissolved	0.41	< 0.0023 F1	0.026	0.016
Hardness	Dissolved	940	740	-	-
Iron	Dissolved	89	< 0.10	2.0	1.0
Lead	Dissolved	< 0.0010	< 0.0010	0.136	0.005
Magnesium	Dissolved	65 B	55 B	-	-
Nickel	Dissolved	0.37	0.013	0.84	0.094
Phosphorous	Dissolved	< 0.20	< 0.20	-	-
Selenium	Total	0.00099 J	< 0.0020 F2 F1	NP	0.005
Sulfate	Total	1400	920	-	-
Zinc	Dissolved	0.48	0.0033 J	0.21	0.21
Acidity	Total	450	< 2.0	-	-
Alkalinity (Bicarbonate)	Total	< 4.8	330	-	-
Alkalinity (Carbonate)	Total	< 2.4	< 2.4	-	-
Alkalinity (Hydroxide)	Total	< 1.4	< 1.4	-	-
Alkalinity (Total)	Total	< 4.0	270	-	-
Total Dissolved Solids	Total	2200	1600	-	-
Total Suspended Solids	Total	< 10	< 10		

Notes:

1. pH values are from Test America lab EDD and are reported in standard units
2. Discharge criteria and basis for maximum and average values are listed in the Request for Approval of Modifications to the Removal Action at the Leviathan Mine Memorandum (U.S. EPA, 2008)

Abbreviations

- < - Constituents that were not detected are listed as "<" and the reporting limit is shown.
- J - Results noted with "J" are an estimated value or were less than the reporting limit but greater than or equal to the method detection limit
- B - Compound was found in the blank and sample
- F1 - MS and/or MSD Recovery is outside acceptance limits.
- ^ - Instrument related QC is outside acceptance limits.
- F2 - MS/MSD RPD exceeds control limits
- mg/L - milligrams per liter

TABLE 2
ASPEN SEEP BIOREACTOR TREATMENT SYSTEM - RECENT FLOW, pH, AND ORP FIELD MEASUREMENTS
FEBRUARY 2017 MONTHLY SUMMARY

Draft - Provisional Data

Date	Aspen Seep Bioreactor Influent ¹			Manhole 1 or 2 (Biocell 1 Influent)		Manhole 4 or 5 (Biocell 1 Effluent/Biocell 2 Influent)		Manhole 6 (NaOH dosing location)		Manhole 7 or 9 (Biocell 2 Effluent)		Aspen Seep Bioreactor Effluent	
	Flow (gpm)	pH (s.u.)	ORP (mV)	pH (s.u.)	ORP (mV)	pH (s.u.)	ORP (mV)	pH (s.u.)	ORP (mV)	pH (s.u.)	ORP (mV)	pH (s.u.)	ORP (mV)
01/07/11 ²	8.5	2.92	434.1	6.50	-134.0	5.98	-200.1	-	-	6.08	-216.2	6.15	-4.9
02/01/11 ²	8.0	3.07	423.8	6.75	-332.2	6.86	-279.7	-	-	6.59	-297.0	6.62	-9.3
03/11/11	8.5	3.05	384.7	7.66	-239.2	7.11	-344.7	-	-	6.85	-370.1	7.05	-73.4
04/19/11 ³	30.0	2.61	454.9	-	-	-	-	-	-	-	-	4.72	172.9
04/26/11	29.0	2.91	362.1	7.45	-199.2	6.58	-346.5	7.42	-232.8	6.41	-369.7	7.22	-144.6
05/03/11	27.0	2.90	355.0	7.70	-264.8	6.56	-361.5	7.81	-264.9	6.54	-402.2	7.60	-137.5
05/11/11	24.0	2.84	344.2	6.81	-198.2	6.31	-229.0	6.99	-200.7	6.23	-204.0	6.99	-139.2
05/20/11	17.0	3.03	372.4	8.10	-282.2	7.09	-361.8	7.89	-219.6	6.39	-367.9	7.36	-44.1
06/01/11	17.5	2.92	378.6	8.18	-175.7	7.11	-360.0	8.14	-272.8	6.55	-337.9	7.32	-50.3
06/15/11 ⁴	15.6	3.18	407.7	-	-	-	-	8.60	-231.3	-	-	8.15	-3.9
06/21/11 ⁴	14.7	3.09	415.6	-	-	-	-	8.15	-184.2	-	-	-	-
06/28/11 ⁵	15.0	2.95	204.5	7.66	-503.6	6.94	-581.5	8.44	-458.1	6.93	-581.5	7.52	-85.1
07/06/11	14.0	2.95	237.1	8.37	-50.3	6.98	-525.6	8.10	-382.9	6.75	-550.2	7.81	-249.1
07/13/11	13.8	2.88	352.2	8.46	-312.3	6.83	-412.1	5.43	-48.5	6.67	-420.1	7.84	-37.4
07/19/11	13.0	3.11	304.3	7.27	-462.3	6.93	-434.0	8.40	-407.5	6.85	-436.0	8.0	-86.6
07/28/11	-	2.98	320.8	8.32	-294.3	7.10	-393.6	8.55	-165.4	6.99	-376.0	7.90	-70.4
08/04/11	12.0	3.12	337.7	7.88	-416.0	7.20	-437.3	8.73	-437.5	7.11	-431.8	8.14	-155.7
08/11/11	12.0	2.85	360.2	7.72	-456.0	7.27	-421.6	8.95	-421.9	6.87	-443.0	8.04	-162.8
08/17/11	12.0	3.00	362.5	6.93	-291.8	6.84	-415.5	8.60	-338.3	6.92	-437.7	7.97	-187.8
08/24/11	12.0	3.01	362.8	6.42	-257.0	7.08	-405.5	8.30	-277.9	6.84	-402.2	7.85	-164.4
08/30/11	12.0	2.90	350.9	8.23	-321.5	7.27	-433.4	7.49	-366.0	7.05	-428.0	7.63	-63.5
09/08/11	12.0	2.98	362.2	7.66	-387.0	6.98	-405.5	7.55	-375.2	6.80	-402.3	7.91	-183.6
09/15/11	12.0	3.01	385.0	8.16	-194.0	6.97	-372.7	8.38	-359.1	6.90	-342.6	8.07	-146.1
09/23/11 ⁴	12.0	2.99	400.1	-	-	-	-	6.81	-142.1	-	-	8.30	-295.9
09/28/11	12.0	2.86	429.9	7.29	-312.1	6.76	-232.9	7.11	-108.4	6.71	-224.1	7.54	-131.1
10/06/11	12.0	2.96	389.0	6.73	-220.1	6.48	-281.5	6.55	-250.8	6.80	-331.8	7.01	-159.3
10/20/11	-	-	-	-	-	-	-	7.50	-375.9	6.93	-365.1	-	-
10/21/11 ⁶	-	-	-	-	-	-	-	3.14	416.8	6.86	-365.1	-	-
10/27/11	-	3.13	424.5	-	-	-	-	6.91	-189.7	-	-	-	-
10/28/11	11.5	2.91	375.7	7.26	-186.5	6.68	-246.5	7.41	-215.3	6.84	-265.3	7.10	-159.0
11/08/11	-	3.12	368.8	-	-	-	-	-	-	-	-	-	-

TABLE 2
ASPEN SEEP BIOREACTOR TREATMENT SYSTEM - RECENT FLOW, pH, AND ORP FIELD MEASUREMENTS
FEBRUARY 2017 MONTHLY SUMMARY

Draft - Provisional Data

Date	Aspen Seep Bioreactor Influent ¹			Manhole 1 or 2 (Biocell 1 Influent)		Manhole 4 or 5 (Biocell 1 Effluent/Biocell 2 Influent)		Manhole 6 (NaOH dosing location)		Manhole 7 or 9 (Biocell 2 Effluent)		Aspen Seep Bioreactor Effluent	
	Flow (gpm)	pH (s.u.)	ORP (mV)	pH (s.u.)	ORP (mV)	pH (s.u.)	ORP (mV)	pH (s.u.)	ORP (mV)	pH (s.u.)	ORP (mV)	pH (s.u.)	ORP (mV)
11/10/11	11.8	3.08	369.9	-	-	-	-	7.13	-213.9	-	-	-	-
11/15/11	11.5	3.08	371.9	7.89	-335.8	7.21	-223.6	7.54	-252.3	6.68	-348.3	7.14	-109.9
12/07/11	11.0	2.86	375.4	7.30	-260.8	7.01	-347.1	7.51	-387.9	6.72	-334.1	7.21	-114.9
01/04/12	-	-	-	-	-	7.72	-232.2	8.13	-148.7	6.19	-344.4	7.65	-242.4
01/05/12	10.0	2.65	396.7	7.14	-406.2	8.34	-368.0	8.40	-318.9	6.16	-380.4	8.20	-31.6
02/10/12	9.0	2.70	400.0	8.60	-246.9	7.69	-248.7	-	-	7.15	-264.4	8.04	61.5
03/08/12	8.6	2.43	401.0	8.61	-301.3	8.21	-240.5	-	-	6.89	-296.8	8.47	81.3
04/19/12	8.3	2.92	395.1	8.20	-305.7	6.87	-357.7	8.51	-375.3	6.50	-342.9	7.49	-94.7
04/27/12	9.4	3.15	377.9	8.22	-90.6	7.00	-239.6	8.14	-286.9	6.52	-388.1	7.56	-75.8
05/03/12	7.8	2.99	369.7	7.99	-288.6	7.27	-286.9	8.12	-348.5	6.68	-387.7	7.80	-33.5
05/18/12	-	2.58	394.3	8.04	-220.4	6.84	-251.4	7.58	-313.4	6.67	-281.9	7.64	-106.5
05/30/12	7.8	3.16	363.3	8.06	-287.9	6.94	-431.6	8.38	-348.0	8.97	-420.8	-	-
06/06/12	7.9	2.60	399.6	8.36	-224.6	6.71	-365.3	8.46	-356.2	6.83	-394.2	7.86	-51.7
06/14/12	6.8	3.02	376.8	7.09	-426.9	7.23	-354.6	8.81	-350.3	6.94	-357.8	7.62	-169.2
06/18/12	7.2	2.76	395.4	8.45	-319.4	7.38	-402.1	8.24	-420.6	6.98	-399.7	7.87	-174.3
06/26/12	6.8	3.01	369.3	8.01	-293.3	6.98	-360.6	8.23	-272.9	7.27	-355.7	7.82	-203.7
07/05/12	6.8	2.98	363.9	8.39	-397.1	7.14	-430.6	7.60	-346.7	7.07	-418.4	-	-
07/11/12	5.6	2.82	403.1	8.00	-346.1	7.22	-406.7	7.58	-388.7	6.76	-398.6	7.49	-144.9
07/18/12	6.0	2.85	396.4	8.38	-402.9	7.01	-421.0	7.94	-374.0	6.83	-420.0	7.39	-337.9
07/24/12	6.5	2.72	403.0	8.30	-412.1	6.98	-409.6	7.96	-389.9	6.91	-412.9	7.51	-129.0
08/02/12	5.8	2.81	437.5	8.05	-396.3	7.43	-405.5	8.91	-97.1	7.29	-389.6	-	-
08/06/12	5.3	2.89	395.8	7.92	-353.2	7.72	-446.1	9.50	-16.0	7.71	-428.5	-	-
08/14/12	6.0	2.85	470.5	8.37	-326.7	7.07	-351.8	8.33	-274.0	7.02	-342.5	-	-
08/21/12	5.3	2.83	390.7	8.55	-438.1	7.34	-425.5	8.48	-407.5	7.36	-429.1	7.03	-156.2
08/28/12	5.6	2.78	427.9	8.40	-401.5	7.30	-409.7	8.17	-368.0	7.16	-409.3	7.44	-131.3
09/05/12	5.8	2.95	478.0	8.44	-360.4	7.44	-360.2	8.35	-300.9	7.27	-342.2	8.03	-99.9
09/13/12	5.6	2.91	428.7	8.41	-380.4	7.45	-389.9	8.13	-361.1	7.45	-390.9	7.76	42.5
09/19/12	5.5	2.99	446.9	8.24	-359.8	7.36	-367.1	7.85	-321.5	7.26	-372.9	7.97	9.5
09/26/12	5.4	3.11	482.0	6.60	-311.9	6.76	-333.3	8.27	-261.7	7.07	-357.6	8.09	35.5
09/27/12 ⁷	-	-	-	-	-	-	-	-	-	-	-	7.82	-124.6
10/01/12	5.5	2.92	461.7	7.87	-360.3	6.72	-362.0	7.48	-299.5	6.42	-345.8	7.58	37.4
10/04/12 ⁷	-	-	-	-	-	-	-	-	-	-	-	7.71	59.0

TABLE 2
ASPEN SEEP BIOREACTOR TREATMENT SYSTEM - RECENT FLOW, pH, AND ORP FIELD MEASUREMENTS
FEBRUARY 2017 MONTHLY SUMMARY

Draft - Provisional Data

Date	Aspen Seep Bioreactor Influent ¹			Manhole 1 or 2 (Biocell 1 Influent)		Manhole 4 or 5 (Biocell 1 Effluent/Biocell 2 Influent)		Manhole 6 (NaOH dosing location)		Manhole 7 or 9 (Biocell 2 Effluent)		Aspen Seep Bioreactor Effluent	
	Flow (gpm)	pH (s.u.)	ORP (mV)	pH (s.u.)	ORP (mV)	pH (s.u.)	ORP (mV)	pH (s.u.)	ORP (mV)	pH (s.u.)	ORP (mV)	pH (s.u.)	ORP (mV)
10/10/12 ⁷	5.5	2.49	428.6	8.16	-374.5	6.95	-382.2	7.42	-322.2	6.71	-379.5	7.87	42.9
10/17/12	5.4	2.50	432.0	8.53	-351.0	7.44	-347.6	8.23	-314.7	7.15	-350.8	7.89	2.4
11/07/12 ^{4,8}	5.5	2.46	435.6	-	-	-	-	7.46	67.5	-	-	-	-
11/14/12 ⁸	5.5	2.52	344.1	7.46	78.0	6.85	52.8	7.32	48.0	6.80	76.5	6.82	104.3
12/11/12	5.0	1.96	454.5	7.65	-37.9	6.93	-101.9	8.02	-109.1	6.54	-291.0	7.21	120.5
01/09/13	5.1	2.25	464.2	6.91	-163.3	6.71	-208.3	-	-	6.41	-231.1	6.84	-19.7
02/07/13	5.0	1.81	435.9	8.91	-190.2	7.17	-289.4	8.89	-158.6	7.17	-269.5	8.60	-39.5
03/01/13	5.0	2.75	502.8	8.21	-174.0	7.67	-249.7	8.47	-223.8	7.14	-224.9	8.42	-133.0
03/22/13 ⁹	-	-	-	-	-	-	-	-	-	-	-	8.21	81.4
04/11/13	5.0	2.80	484.9	8.45	-102.1	7.27	-247.5	7.70	-198.3	7.07	-264.1	8.07	105.5
05/01/13	5.0	2.91	426.5	8.63	-207.4	7.31	-267.3	7.62	-231.8	7.15	-264.1	7.35	-59.9
05/12/13	5.0	2.88	371.3	8.51	-223.9	7.27	-275.9	7.87	-241.9	7.01	-320.0	-	-
05/20/13	4.5	2.58	352.3	-	-	-	-	-	-	-	-	8.01	83.0
05/21/13	-	-	-	8.42	-412.3	7.23	-420.9	7.59	-379.8	7.05	-419.7	-	-
05/30/13	4.5	2.78	451.2	8.49	-322.8	7.31	-336.2	8.06	-305.5	7.33	-328.3	7.94	-112.2
06/03/13	4.4	2.78	415.2	8.54	-317.8	7.36	-404.4	7.30	-346.5	7.20	-371.6	8.17	-155.7
06/06/13	4.5	2.78	437.8	8.31	-364.1	7.42	-402.9	7.90	-304.1	7.30	-411.2	7.86	-30.2
06/12/13	4.2	2.70	458.6	7.58	-373.1	7.61	-352.8	8.33	-259.9	7.46	-348.2	-	-
06/17/13	4.2	2.87	421.8	8.32	-291.4	7.31	-302.6	8.85	-367.9	7.21	-381.3	7.75	-47.9
06/25/13	4.2	2.60	427.0	8.18	-343.6	7.17	-374.9	7.65	-313.7	7.11	-373.7	7.82	-79.4
07/02/13	4.0	2.61	421.0	8.20	-328.4	7.14	-380.6	7.60	-289.7	7.05	-366.0	7.83	-133.0
07/09/13	4.0	2.59	442.9	8.39	-315.0	7.26	-359.2	7.81	-284.7	7.31	-366.7	7.73	-27.7
07/16/13	3.6	2.65	395.0	8.27	-373.7	7.35	-407.0	8.07	-323.9	7.15	-400.9	7.76	-86.3
07/23/13	4.0	2.60	407.3	8.24	-354.3	7.30	-388.2	7.56	-347.2	7.34	-367.9	7.86	-19.9
07/30/13	4.1	2.59	399.7	8.27	-396.8	7.26	-419.2	7.32	-428.9	7.35	-428.9	-	-
08/06/13	4.0	2.48	443.2	8.34	-368.1	7.23	-373.9	7.63	-325.1	7.33	-378.2	8.25	-38.0
08/14/13	4.0	2.60	428.5	8.26	-371.9	7.18	-378.9	7.49	-327.5	7.08	-375.6	7.36	-91.0

TABLE 2
ASPEN SEEP BIOREACTOR TREATMENT SYSTEM - RECENT FLOW, pH, AND ORP FIELD MEASUREMENTS
FEBRUARY 2017 MONTHLY SUMMARY

Draft - Provisional Data

Date	Aspen Seep Bioreactor Influent ¹			Manhole 1 or 2 (Biocell 1 Influent)		Manhole 4 or 5 (Biocell 1 Effluent/Biocell 2 Influent)		Manhole 6 (NaOH dosing location)		Manhole 7 or 9 (Biocell 2 Effluent)		Aspen Seep Bioreactor Effluent	
	Flow (gpm)	pH (s.u.)	ORP (mV)	pH (s.u.)	ORP (mV)	pH (s.u.)	ORP (mV)	pH (s.u.)	ORP (mV)	pH (s.u.)	ORP (mV)	pH (s.u.)	ORP (mV)
08/20/13	4.0	2.47	434.3	8.90	-371.3	7.48	-316.5	7.74	-313.3	7.23	-314.7	7.47	-4.6
09/09/13	3.6	2.33	426.3	7.69	-58.3	7.43	-231.7	7.96	-110.7	7.21	-241.3	7.50	-3.7
09/17/13	3.5	2.57	417.8	8.15	-232.2	7.06	-257.7	7.41	-259.1	7.03	-330.3	6.89	26.1
09/24/13	3.5	2.46	430.9	8.11	-356.3	7.31	-383.6	7.83	-222.8	6.72	-352.3	7.86	35.9
10/02/13	3.6	2.31	440.1	7.99	-332.5	6.33	-372.0	7.67	-341.9	6.85	-381.4	8.00	-214.0
10/07/13	3.6	2.26	448.6	7.89	-301.4	6.64	-314.9	7.30	-297.5	6.63	-320.2	-	-
10/16/13 ⁴	3.6	2.62	430.5	-	-	-	-	8.06	-12.0	-	-	-	-
10/22/13 ⁴	3.5	2.45	432.4	-	-	-	-	7.55	72.0	-	-	6.81	99.7
10/30/13	3.6	2.28	427.0	7.75	-356.4	6.79	-353.6	7.56	-304.9	6.84	-354.7	-	-
11/05/13	3.1	2.13	452.6	8.47	-295.5	7.08	-344.9	7.53	-275.8	7.00	-316.2	7.13	97.5
12/11/13	3.5	2.47	415.7	-	-	-	-	-	-	-	-	7.81	-181.7
12/12/13	-	-	-	6.45	-266.6	6.47	-314.7	6.57	-315.5	7.14	-252.3	-	-
01/02/14	3.2	4.10	392.7	7.30	-249.7	6.25	-244.2	7.91	-222.3	6.90	-257.3	7.50	-144.2
02/13/14	3.5	2.46	416.2	8.2	-289.3	7.34	-352.4	6.97	-298.4	7.23	-351.2	7.68	-293.3
03/12/14	3.0	2.58	516.4	8.31	-184.1	7.52	-291.8	7.85	-343.3	7.19	-279.1	7.04	54.1
04/15/14	2.8	2.81	458	8.02	-205.1	7.11	-346.6	8.1	-255.6	7.29	-374.1	8.03	-151.2
05/08/14	2.0	2.7	221	8.42	-259.2	7.03	-14.3	7.69	-300	6.7	-324.7	7.49	-83.4
05/13/14	2.5	2.81	466.3	8.63	-265.4	7.05	-303	7.93	-314.6	6.9	-309.6	7.93	-90.1
05/28/14	2.7	2.82	437.2	8.27	-380	7.3	-398.5	7.47	-351.5	7.22	-408.2	8.03	-142.1
06/03/14	2.5	2.9	502.6	8.41	-306	7.41	-314.6	7.43	-290.2	7.33	-321.1	7.35	-52
06/09/14	2.0	2.93	443.4	8.24	-351	7.4	-369.8	7.54	-343.2	7.25	-361.8	-	-
06/17/14	2.5	2.74	439.7	8.3	-355.5	7.32	-381.1	6.83	-273.5	7.39	-393.5	-	-
06/24/14	2.0	2.97	419.3	8.33	-365.2	7.38	-392.8	7.29	-320.1	7.32	-387.1	-	-
07/02/14	1.8	2.71	425.0	8.28	-369.4	7.37	-403.1	7.56	-357.4	7.34	-397.0	-	-
07/08/14	2.0	2.81	411.6	8.25	-386.7	7.36	-399.9	7.49	-345.8	7.34	-369.8	-	-
07/16/14	2.4	2.59	433.2	8.32	-375.2	7.54	-401.3	7.54	-328.3	7.49	-396.1	8.07	-221.8
07/23/14	2.2	2.88	433	8.33	-365.2	7.3	-366.1	7.11	-305.8	7.16	346.2	7.87	-170.2
07/29/14	2.0	2.82	463.4	8.31	-325.7	7.38	-342.5	7.64	-294.2	7.30	-345.7	8.33	-203.2
08/06/14	2.0	2.96	568.7	8.48	-281.3	7.68	-317.9	7.87	-253.0	7.63	-313.1	8.34	-93.8

TABLE 2
ASPEN SEEP BIOREACTOR TREATMENT SYSTEM - RECENT FLOW, pH, AND ORP FIELD MEASUREMENTS
FEBRUARY 2017 MONTHLY SUMMARY

Draft - Provisional Data

Date	Aspen Seep Bioreactor Influent ¹			Manhole 1 or 2 (Biocell 1 Influent)		Manhole 4 or 5 (Biocell 1 Effluent/Biocell 2 Influent)		Manhole 6 (NaOH dosing location)		Manhole 7 or 9 (Biocell 2 Effluent)		Aspen Seep Bioreactor Effluent	
	Flow (gpm)	pH (s.u.)	ORP (mV)	pH (s.u.)	ORP (mV)	pH (s.u.)	ORP (mV)	pH (s.u.)	ORP (mV)	pH (s.u.)	ORP (mV)	pH (s.u.)	ORP (mV)
08/12/14	2.0	2.74	490.3	8.41	-259.4	7.32	-334.4	7.60	-271.0	7.30	-333.3	7.74	-96.4
08/19/14	2.1	2.88	496.4	8.45	-237.3	7.41	-317.7	7.53	-276.4	7.38	-312.1	7.32	-95.4
08/26/14	2.2	2.95	505.1	8.51	-247.4	7.55	-306.3	7.77	-242.2	7.48	-297.2	7.54	-43
09/02/14	2.0	2.8	512.8	8.5	-276.8	7.54	-318.9	7.71	-224.1	7.45	-331.7	8.33	-113
09/9/2014 ¹⁰	1.9	2.86	498.1	-	-	-	-	-	-	-	-	7.81	-190
09/15/2014 ¹⁰	1.8	2.83	482.7	-	-	-	-	-	-	-	-	7.9	69.4
09/22/14	2.0	2.86	482.6	8.34	-277.5	7.42	-316.8	7.85	-248.5	7.25	-299.5	8.11	-21.6
09/30/14	2.2	2.8	479.2	8.19	-279.2	7.41	-335.4	7.91	-249.4	7.40	-332.4	-	-
10/06/14	2.0	2.62	484.9	8.33	-241.5	7.52	-248.4	7.91	-247.2	7.56	-225.6	-	-
10/14/14	2.0	2.91	155.6	8.36	-402.9	7.69	-411.4	7.94	-350.9	7.54	-428.8	-	-
10/23/14	1.8	2.87	480.3	8.83	-309.2	8.12	-332	7.76	-277.3	7.91	-326.9	7.77	122
10/29/14	2.2	2.75	475	7.94	-277.2	7.34	-285	7.34	-215.9	7.27	-281.6	-	-
11/05/14	2.3	2.86	462.2	8.26	-263.7	7.48	-267.5	7.45	-193.3	7.63	-316.7	7.21	163
11/10/14	2.0	2.71	486.9	8.29	-227.3	7.50	-292.3	8.10	-275.2	7.30	-273.5	7.22	174.5
12/09/14	2.0	2.77	471.2	8.33	-271.3	7.50	-316.2	7.81	-255.6	7.43	-318	7.61	9.7
01/14/15	2.2	2.35	455.3	8.01	-322.1	7.52	-306.7	8.38	-296.3	7.39	-360.1	7.47	-216.2
02/04/15	2.0	2.64	490	8.35	-311.5	7.76	-306.3	7.80	-276.3	7.69	-301.6	7.5	-88.9
03/17/15	1.9	2.33	498.5	8.9	-338.9	7.35	-318.9	7.10	-245.1	7.04	-294.4	7.33	156.9
04/14/15	1.6	2.88	452	8.72	-296.4	7.62	-299.8	8.02	-247.2	7.51	-303.3	8.32	16.7
04/22/15	1.6	2.79	434.5	8.53	-273.6	7.49	-257.2	7.67	-304.8	7.27	-247.9	8.03	66.7
04/29/15	1.6	2.8	460.2	8.61	-333.7	7.78	-302.9	7.88	-280.5	7.48	-333.3	7.72	52
05/06/15	1.4	2.73	494.6	8.48	-302.4	7.92	-337.1	7.80	-279.8	7.58	-361.7	8.36	10.1
05/12/15	1.5	2.75	482.5	8.49	-333.8	7.74	-294.9	7.25	-249.5	7.38	-320.9	7.68	42.7
05/27/15	1.8	2.59	471.5	8.13	-326.5	8.30	-318.5	7.10	-281.5	7.26	-338	7.15	-261.8
06/03/15	1.4	2.95	433.6	8.27	-331.3	8.10	-302.2	7.54	-254.3	7.29	-294.7	-	-
06/09/15	1.4	2.79	454.8	8.21	-289.1	8.11	-269.8	6.79	-248.1	7.07	-267.3	-	-
06/16/15	1.3	2.65	385	8.35	-404.4	8.32	-377.3	7.41	-356.7	7.40	-402.1	7.85	-217.3
07/01/15	1.7	2.77	301.2	8.09	-383.2	7.14	-407.6	6.68	-321.6	6.92	-394.6	-	-
07/08/15	2.0	2.69	385.3	7.9	-327	7.58	-399.6	7.45	-338.2	7.59	-400.2	-	-
07/14/15	1.4	2.85	381.3	9.77	-467.5	7.38	-370	7.12	-322.7	7.41	-405.2	8.18	-211.9
07/16/15	1.4	2.84	383.4	8.16	-346	7.08	-383.8	7.28	-331.0	6.88	-370	8.19	-271.7
07/21/15	1.6	2.66	389.0	8.04	-308.1	7.32	-355.3	7.31	-291.3	7.25	-305.5	7.70	-159.7

TABLE 2
ASPEN SEEP BIOREACTOR TREATMENT SYSTEM - RECENT FLOW, pH, AND ORP FIELD MEASUREMENTS
FEBRUARY 2017 MONTHLY SUMMARY

Draft - Provisional Data

Date	Aspen Seep Bioreactor Influent ¹			Manhole 1 or 2 (Biocell 1 Influent)		Manhole 4 or 5 (Biocell 1 Effluent/Biocell 2 Influent)		Manhole 6 (NaOH dosing location)		Manhole 7 or 9 (Biocell 2 Effluent)		Aspen Seep Bioreactor Effluent	
	Flow (gpm)	pH (s.u.)	ORP (mV)	pH (s.u.)	ORP (mV)	pH (s.u.)	ORP (mV)	pH (s.u.)	ORP (mV)	pH (s.u.)	ORP (mV)	pH (s.u.)	ORP (mV)
07/28/15	1.2	2.94	338.7	8.37	-328.3	7.53	-366.9	7.51	-315.7	7.50	-348.1	8.10	-156.1
08/03/15	1.2	2.74	376.5	8.29	-371.3	7.66	-382.6	7.48	-334.5	7.28	-379.1	7.68	-94.2
08/14/2015 ¹⁰	2.2	2.40	413.6	-	-	-	-	-	-	-	-	-	-
08/20/2015 ¹⁰	1.2	2.74	393.3	-	-	-	-	-	-	-	-	-	-
08/26/2015 ¹⁰	1.0	2.55	344.7	-	-	-	-	-	-	-	-	-	-
09/04/15	1.2	2.75	416.3	8.16	-383.5	7.60	-402.7	7.57	-355.4	7.57	-407.9	-	-
09/10/15	1.1	2.78	362.2	7.98	-360.1	7.26	-360.9	7.65	-347.8	7.11	-399.7	-	-
09/18/15	1.2	2.53	284.4	7.92	-343.1	7.20	-383.6	7.75	-353.9	7.14	-388.9	-	-
09/23/15	1.2	2.76	365.0	8.34	-450.9	7.76	-442.9	7.80	-347.6	7.50	-419.6	-	-
09/30/15	1.3	2.74	365.0	8.17	-378.7	7.58	-431.1	7.31	-367.5	7.41	-408.3	-	-
10/07/15	1.3	2.66	367.5	8.06	-320.7	7.54	-370.4	6.89	-333.9	7.28	-388.9	-	-
10/14/15	1.3	2.79	356	8.32	-343.6	7.80	-362.3	7.10	-298.1	7.42	-396.5	-	-
10/22/15	1.2	2.81	348.1	8.51	-292.8	7.55	-367.9	7.58	-270.5	7.74	-384.4	7.53	107.5
11/12/15	1.2	2.61	392.3	8.35	-312.9	7.70	-341.8	7.52	-295.8	7.61	-376.8	8.29	-106.4
12/02/15	1.4	2.26	407.3	8.7	-354.3	7.11	-377.1	7.08	-330.5	6.99	-370.5	7.03	-96.1
01/12/16	1.4	2.24	419.7	8.4	-371.9	7.23	-408.1	9.89	-262.1	7.52	-399.9	7.92	-148.6
03/17/16	3.6	2.54	424	7.48	-209.6	7.46	-343.7	6.87	-258.7	7.25	-357.4	7.48	209.2
04/18/16	3.5	2.71	411.2	7.47	-199.6	7.76	-173.4	7.02	-188.8	8.09	-315.9	7.89	-45.1
05/11/16	5.4	2.89	383.9	7.69	-234.8	7.39	-350	6.19	-316.9	7.05	-366.7	7.34	-112.4
05/18/16	7.0	2.69	398.6	8.3	-241.7	7.35	-362.6	5.54	-266.5	7.24	-356.9	7.59	-124.5
05/26/16	5.0	2.72	399.2	7.91	-229.7	7.93	-248.3	6.80	-311.4	7.08	-354.7	7.53	50.5
05/31/16	5.2	2.85	400.5	8.05	-229.7	7.75	-306.7	7.15	311.9	6.81	-338.7	7.42	-108.5
06/06/16	6.0	2.58	418.4	8.49	-249.6	7.64	-379.1	7.38	-356.3	7.25	-394.4	7.67	-96.9
06/14/16	4.2	2.33	446.8	8.32	-247.3	8.33	-368.8	7.25	-335.2	7.45	-386.9	7.59	-24.9
06/21/16	5.2	2.86	479	8.26	-136.9	7.38	-275.5	7.48	-279.8	7.36	-311.9	7.83	-23.4
06/28/16	5.0	2.98	489.7	7.83	-267.7	7.15	-276.7	7.21	-233.3	7.15	-298.1	7.9	-53.4
07/06/16	5.2	3.08	465.1	8.02	-255.6	7.27	-286.2	7.05	-224.6	7.32	-294.7	7.54	-59.2
07/12/16	5.3	2.65	478.3	8.64	-273.2	7.16	-300.1	7.26	-271.5	7.21	-299.9	7.42	383
07/19/16	5.2	2.91	499.7	8.32	-252	7.16	-284.4	7.34	-257.8	7.24	-312.5	7.31	27
07/26/16	5.0	2.86	486.6	8.57	-272	7.29	-229.7	6.97	-98.2	7.09	-214.7	7.27	-10.6
08/03/16	5.0	2.52	468.3	8.42	-314.8	7.21	-340.6	7.12	-306.4	7.16	-353.0	7.43	10.6

TABLE 2
ASPEN SEEP BIOREACTOR TREATMENT SYSTEM - RECENT FLOW, pH, AND ORP FIELD MEASUREMENTS
FEBRUARY 2017 MONTHLY SUMMARY

Draft - Provisional Data

Date	Aspen Seep Bioreactor Influent ¹			Manhole 1 or 2 (Biocell 1 Influent)		Manhole 4 or 5 (Biocell 1 Effluent/Biocell 2 Influent)		Manhole 6 (NaOH dosing location)		Manhole 7 or 9 (Biocell 2 Effluent)		Aspen Seep Bioreactor Effluent	
	Flow (gpm)	pH (s.u.)	ORP (mV)	pH (s.u.)	ORP (mV)	pH (s.u.)	ORP (mV)	pH (s.u.)	ORP (mV)	pH (s.u.)	ORP (mV)	pH (s.u.)	ORP (mV)
08/09/16	5.0	3.36	-52.1	8.14	-338.0	7.10	-328.7	7.50	-325.5	7.43	-358.6	8.17	-77.8
08/16/16	5.0	2.73	472.7	8.66	-290.1	7.27	-339.0	7.23	-279.0	7.31	-349.5	8.41	-189.6
08/24/16	5.0	2.80	461.5	8.11	-313.8	7.16	-334.6	6.88	-275.0	7.19	295.0	-	-
08/31/16	4.5	2.43	493.3	7.89	-313.0	7.08	-323.8	7.11	-295.7	7.45	-391.9	-	-
09/07/16	4.8	2.84	444.3	8.25	-319.7	7.45	-328.7	7.72	-302.2	7.53	-312.7	-	-
09/12/16 ⁷	4.5	2.59	497.7	8.24	-285.1	7.38	-300.5	7.72	-281.9	7.27	-311.2	8.37	-95.4
09/20/16	5.0	2.15	500.9	7.67	-296.1	7.02	-303.8	7.26	-251.5	6.93	-299.4	-	-
09/28/16	4.5	2.38	442.5	8.15	-317.8	7.52	-353.0	7.31	-275.7	7.40	-373.8	-	-
10/06/16	4.9	2.69	425.8	8.32	-281.3	7.38	-296	7.78	-267.1	7.26	-293.3	-	-
10/13/16	4.5	2.6	435.7	9.96	-361.9	7.57	-364.3	7.47	-287.1	7.45	-349.4	8.03	105.3
10/20/16	5.0	2.18	463.8	8.06	-298.2	7.36	-356.7	7.70	-302.5	7.50	-370.1	8.33	-142.5
11/08/16	4.8	2.56	417.2	9.04	-386.7	7.39	-370.1	7.35	-281.7	7.30	-376.2	7.77	59.2
12/02/16	4.5	2.13	453.2	7.68	-297.3	7.11	-295.1	7.44	-290.9	7.01	-333.4	7.58	-208.1
1/6/2017 ¹¹	5.0	0.95	495	-	-	-	-	-	-	-	-	7.77	-204.7
02/01/17	5.5	2.77	425.5	8.98	-293.7	8.50	-341.9	8.23	-386.9	8.24	-367.9	7.44	-231.9

Notes

¹ Aspen Seep Bioreactor influent flow rate measurements are field measurements collected with a graduated bucket and stop watch.

² Low pH measurements due to power outage and associated chemical pump downtime during the inverter failure on 11/29/10.

³ Low pH measurements due to increase in system flow rates; chemical dosing rates lagged behind these system flow rate increases and were unable to prevent decrease in system pH.

⁴ Field measurements at intermediate bioreactor manholes were not collected when recirculation operations were interrupted due to sludge dewatering operations, biocell flushing, or other maintenance activities.

⁵ ORP measurements may be inaccurate due to probe calibration issues.

⁶ Low pH measurements due to a power outage and associated chemical pump shutdown.

⁷ Effluent parameters were collected at the sludge dewatering filtrate discharge.

⁸ High ORP measurements in manholes due to recirculation system downtime.

⁹ Effluent only parameters were collected during effluent launder screen repairs.

¹⁰ Influent only parameters were collected during Aspen solids management.

¹¹ Influent pH measured in the field was low. Influent pH measured by the laboratory was 2.4 s.u. Field parameters were only measured at influent and effluent due to time constraints.

Abbreviations

"-" - not measured, not recorded, or bioreactor operation did not have flow at given location on the specified date.

gpm - gallons per minute

mV - millivolts

ORP - oxidation/reduction potential